What is claimed is:

1. A solid electrolytic capacitor comprising:

a valve metal sheet having a porous portion on a first surface thereof;

a dielectric layer provided on said porous portion;

a first insulating portion provided on an outer periphery of said dielectric layer;

a solid electrolyte layer provided on said dielectric layer;

a second insulating portion provided on an outer periphery of said solid electrolyte layer and on said first insulating portion; and

a collector layer provided on said solid electrolyte layer.

2. The solid electrolytic capacitor of claim 1, wherein a recess is formed in an outer periphery of said valve metal sheet, and said first insulating portion is positioned over said recess.

3. The solid electrolytic capacitor of claim 1, further comprising:

a third insulating portion provided on a second surface of said valve metal sheet, said third insulating portion having an opening formed therein; and

a connection terminal connected to said second surface of said valve metal sheet and provided in said opening of said third insulating portion.

4. The solid electrolytic capacitor of claim 3, further comprising a connection bump provided on said connection terminal.

5. The solid electrolytic capacitor of claim 3, further comprising:

a through-hole electrode connected to said collector layer, said through-hole electrode provided in a through-hole formed through said third insulating portion, said valve metal sheet, and said dielectric layer; and

a fourth insulating portion provided in said through-hole, said fourth insulating portion being provided between said through-hole electrode and said valve metal sheet, said fourth insulating portion being provided between said through-hole electrode and said dielectric layer.

6. The solid electrolytic capacitor of claim 5, further comprising a connection bump provided on said through-hole electrode.

7. The solid electrolytic capacitor of claim 1, further comprising:

a third insulating portion provided on said collector layer, said third insulating portion having an opening formed therein; and

a connection terminal connected to said collector layer and provided in said opening of said third insulating portion.

8. The solid electrolytic capacitor of claim 7, further comprising a connection bump provided on said connection terminal.

9. The solid electrolytic capacitor of claim 7, further comprising:

a via-hole electrode connected with said valve metal sheet and provided in a via-hole formed through said collector layer and said solid electrolyte layer; and

a fourth insulating portion provided in said via-hole, said fourth insulating portion being provided between said via-hole electrode and said

solid electrolyte layer said fourth insulating portion being provided between said via-hole electrode and said collector layer.

10. The solid electrolytic capacitor of claim 9, further comprising a connection bump provided on said via-hole electrode.

11. The solid electrolytic capacitor of claim 1, wherein said valve metal sheet includes aluminum.

12. The solid electrolytic capacitor of claim 1, wherein said valve metal sheet comprises:

a valve metal foil, and

a body of sintered valve metal powder provided on said valve metal foil.

13. The solid electrolytic capacitor of claim 1, wherein said solid electrolyte layer includes pi-electron conjugated polymer.

14. The solid electrolytic capacitor of claim 1, wherein said solid electrolyte layer includes conductive polymer.

15. The solid electrolytic capacitor of claim 1, wherein said first insulating portion includes hydrophilic resin.

16. The solid electrolytic capacitor of claim 1, wherein said first insulating portion includes epoxy resin.

17. The solid electrolytic capacitor of claim 1, wherein said solid electrolyte layer extends to a portion between said first insulating portion and said second insulating portion.

18. A method of manufacturing a solid electrolytic capacitor, comprising the steps of:

providing a valve metal sheet having a porous portion on a first surface thereof;

forming a dielectric layer on the porous portion;

forming a first insulating portion on an outer periphery of the dielectric layer;

forming a solid electrolyte layer on the dielectric layer;

forming a second insulating portion on the first insulating portion and the the solid electrolyte layer, the second insulating portion having an opening formed therein that exposes a portion of the solid electrolyte layer; and

forming a collector layer on the exposed portion of the solid electrolyte layer.

19. The method of claim 18, further comprising the step of

forming a recess in an outer periphery of the first surface of the valve metal sheet, the first insulating layer being located over the recess.

20. The method of claim 19, wherein said step of forming the recess comprises the sub-step of forming the recess by at least one of a pressing process, grinding process, chemical etching process, and laser beam machining process.

21. The method of claim 18, further comprising the steps of:

forming a third insulating on a second surface of the valve metal sheet, the third insulating layer having an opening that exposes a portion of the second surface of the valve metal sheet; and

forming a connection terminal in the opening of the third insulating layer, the connection terminal being connected to the second surface of the valve metal sheet.

22. The method of claim 21, further comprising the step of

forming a connection bump on the connection terminal.

23. The method of claim 21, further comprising the steps of:

forming a hole passing through the valve metal sheet and the dielectric layer;

forming a fourth insulating layer in the hole; and

forming a through-hole electrode in the hole, the through-hole electrode being insulated from the valve metal sheet with the fourth insulating layer and connected with the collector layer.

24. The method of claim 23, further comprising the step of

forming a connection bump on the through-hole electrode.

25. The method of claim 18, further comprising the steps of:

forming a third insulating layer on the collector layer, the third insulating layer having an opening that exposes a portion of the collector layer; and

forming a connection terminal in the opening of the third insulating layer, the connection terminal being connected to the collector layer.

26. The method of claim 25, further comprising the step of forming a connection bump on the connection terminal.

27. The method of claim 25, further comprising the steps of:

forming a hole passing through the collector layer, the solid electrolyte layer, and the dielectric layer;

forming a fourth insulating layer in the hole; and

forming a via-hole electrode in the hole, the via-hole being insulated from the collector layer and the solid electrolyte layer with the fourth insulating layer and connected with the valve metal sheet.

28. The method of claim 27, further comprising the step of forming a connection bump on the via-hole electrode.

29. The method of claim 18, wherein said step of forming the solid electrolyte layer comprises the sub-step of forming the solid electrolyte layer by at least one of chemical polymerization and electrolytic polymerization.

30. The method of claim 18, wherein said step of forming the solid electrolyte layer comprises the sub-steps of:

forming a conductive polymer layer by chemical polymerization on the portion of the dielectric layer exposed through the opening of the first insulating layer;

connecting a feed electrode to the conductive polymer layer; and

forming another conductive polymer layer by electrolytic polymerization on the conductive polymer layer with use of the feed electrode.

31. The method of claim 18, wherein the solid electrolyte layer extends to a portion between the first insulating portion and the second insulating portion.

32. The method of claim 31, wherein said step of forming the solid electrolyte layer comprises the steps of:

forming a first conductive polymer layer by chemical polymerization on the dielectric layer and on the first insulating portion;

connecting a feed electrode to a portion of the first conductive polymer layer that is positioned on the first insulating portion; and

forming a second conductive polymer layer by electrolytic polymerization on the first conductive polymer layer with use of the feed electrode.

33. The method of claim 18, wherein said step of forming the collector layer comprises the sub-step of forming the collector layer with fine carbon particle suspension and conductive adhesive.

34. The method of claim 18, wherein said step of forming the collector layer comprises the sub-step of forming the collector layer by evaporation or plating.

35. The method of claim 18, wherein said step of forming the first insulating portion comprises the sub-steps of:

applying insulating resin having a viscosity more than 1Pa•s on the outer periphery of the valve metal sheet; and

hardening the applied insulating resin.

36. The method of claim 18, wherein said step of forming the second insulating portion comprises the sub-steps of:

applying insulating resin having a viscosity more than 1Pa•s on the first insulating portion and the solid electrolyte layer; and

hardening the applied insulating resin.

37. The method of claim 18, wherein said step of forming the first insulating portion comprises the sub-step of forming the first insulating portion by a dispenser.

38. The method of claim 18, wherein said step of forming the second insulating portion comprises the sub-step of forming the second insulating portion by a dispenser.